UK perspectives & IPWG activities

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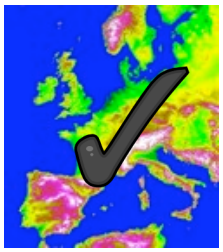
Outline

- UK perspectives
  - international/national/regional contexts
  - examples: Cloudsat & 20th July 2007
- IPWG activities
  - Synergies between IPWG/PERHPP and GPM-GV
- Current AMSR retrievals
  - AMSR rain retrievals
  - Gauge/radar comparisons
- Conclusions

UK multi-level approach

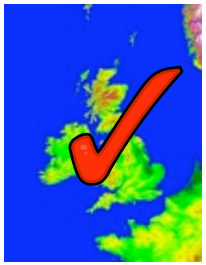
International framework ~2.1m km^2 (+)

- European radar, 5 km/15 minute, gauge



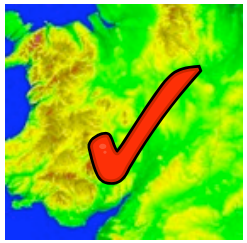
National network (UK) ~700000 km^2

- UK radar network 16 DP/D radars, 5 km/15 minute
- Gauges ~10km spacing, ~2000 hourly/6000 daily



Regional validation (UK) ~31000 km^2

- Single radars: 2 km/5 minute, + gauges

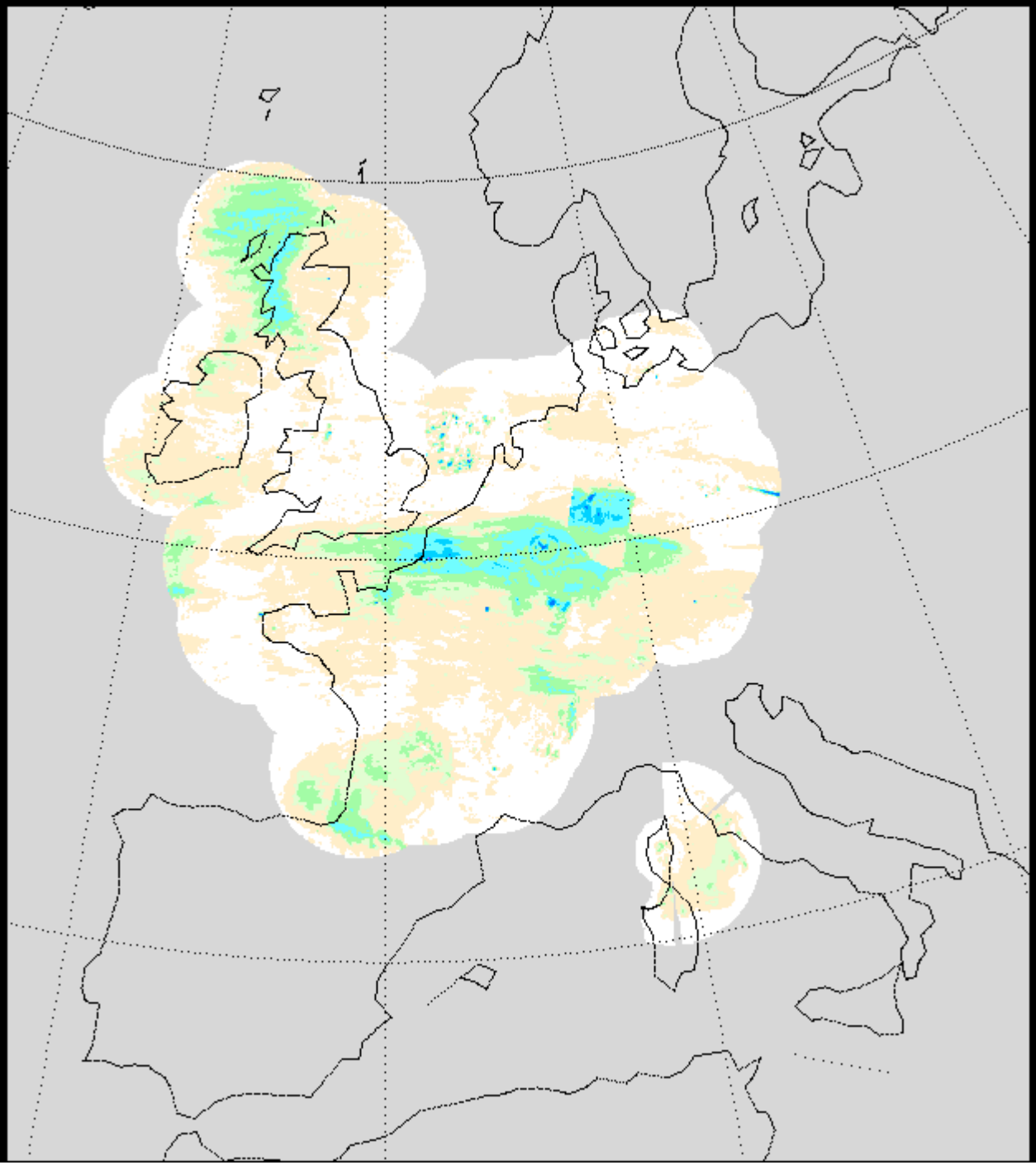


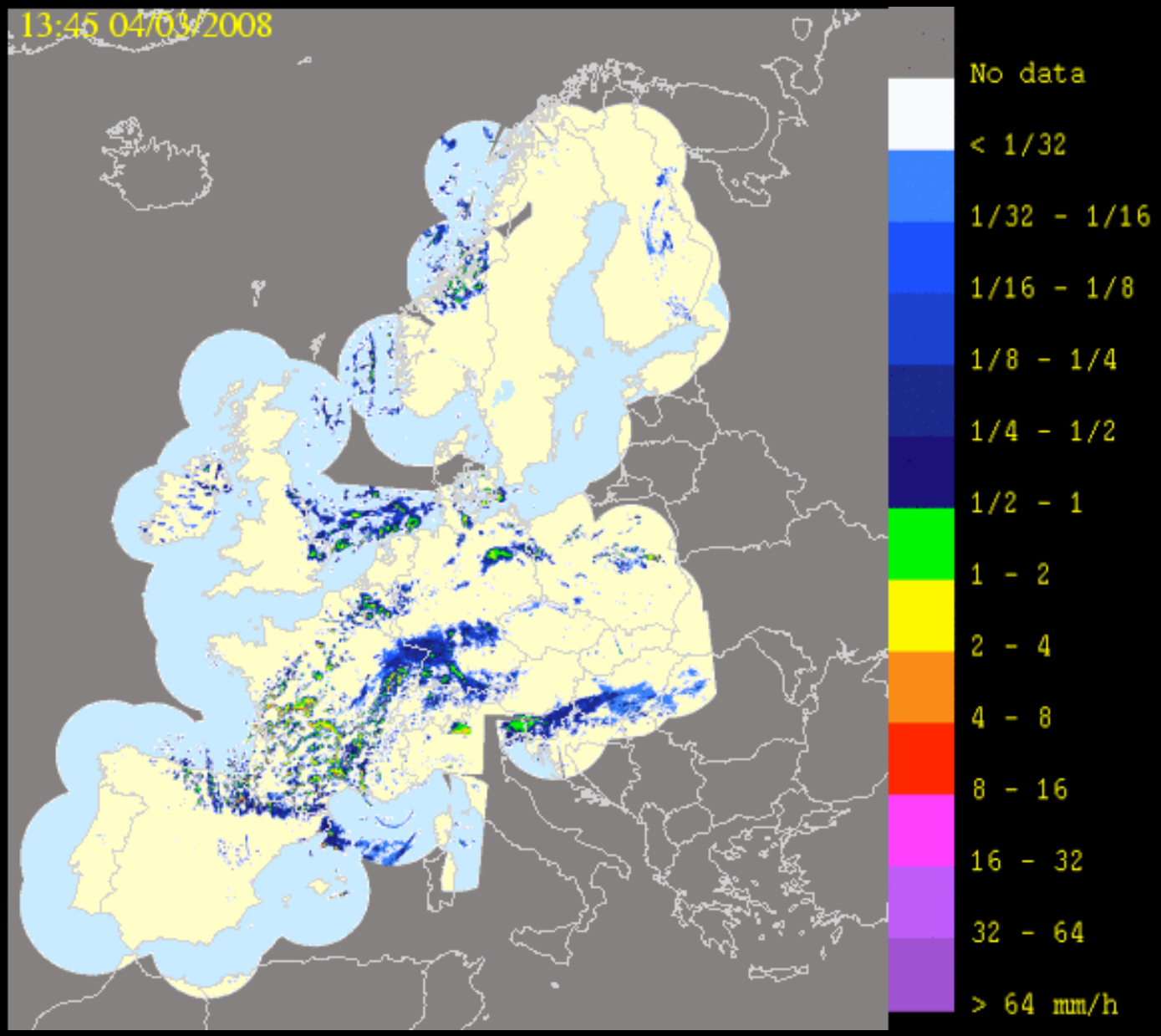
Physical validation (15000 km^2)

- Chilbolton radar + associated instrumentation
- Facility for Airborne Atmospheric Measurements (FAAM)
- Micro rain radars (Doppler – DSDs)

International framework

Current European radar network – used in IPWG



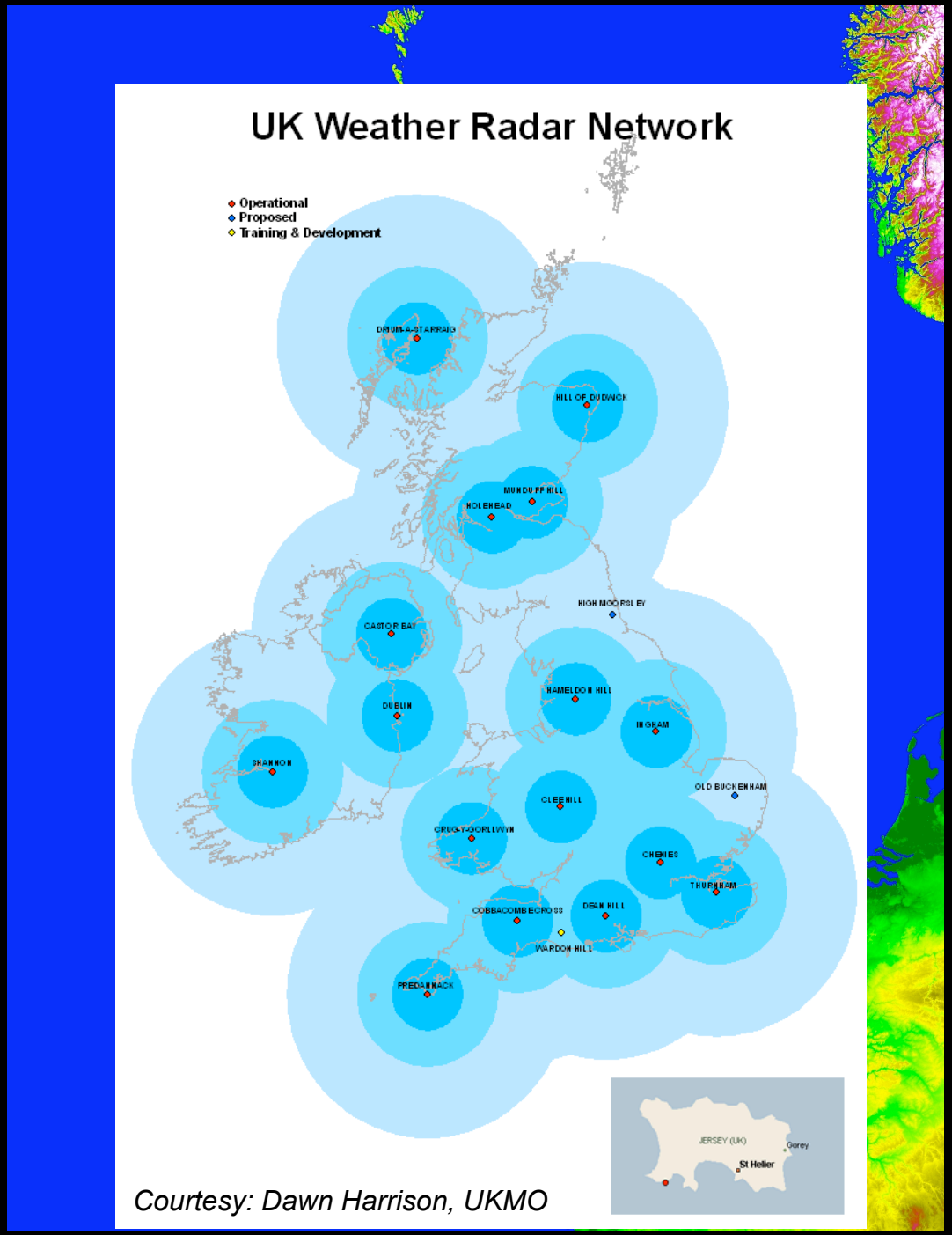


Negotiations starting on obtaining pan-European radar data sets

UK context

Weather:

- Dominated by frontal systems
- Occasional MCSs in summer
- Occasional snow/blizzards in winter
- Low-level precip. common



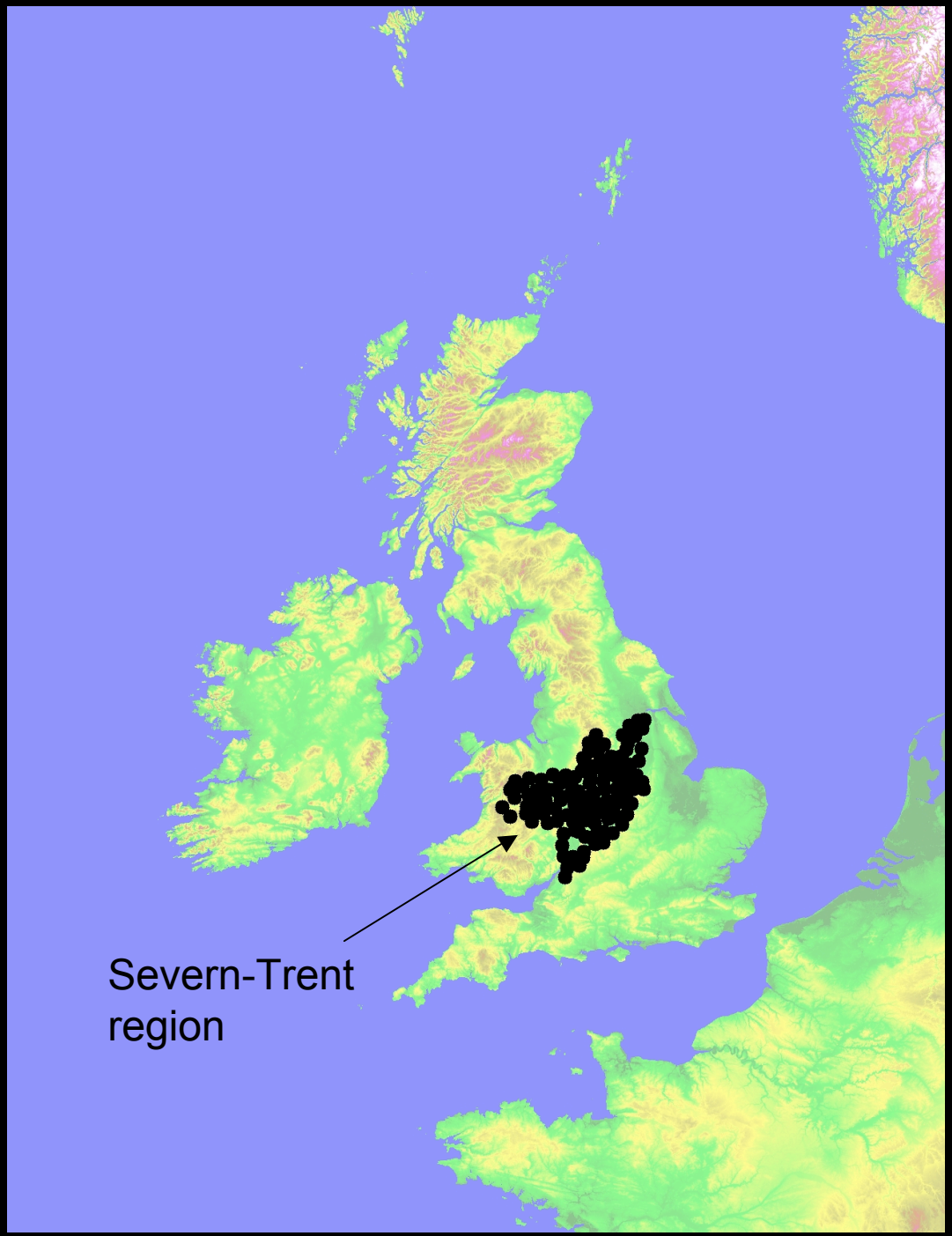
Courtesy: Dawn Harrison, UKMO

National network

Gauges:

~6000 daily *(UKMO)*

~2000 TBRs *(water companies)*
(~40 gauges/deg)



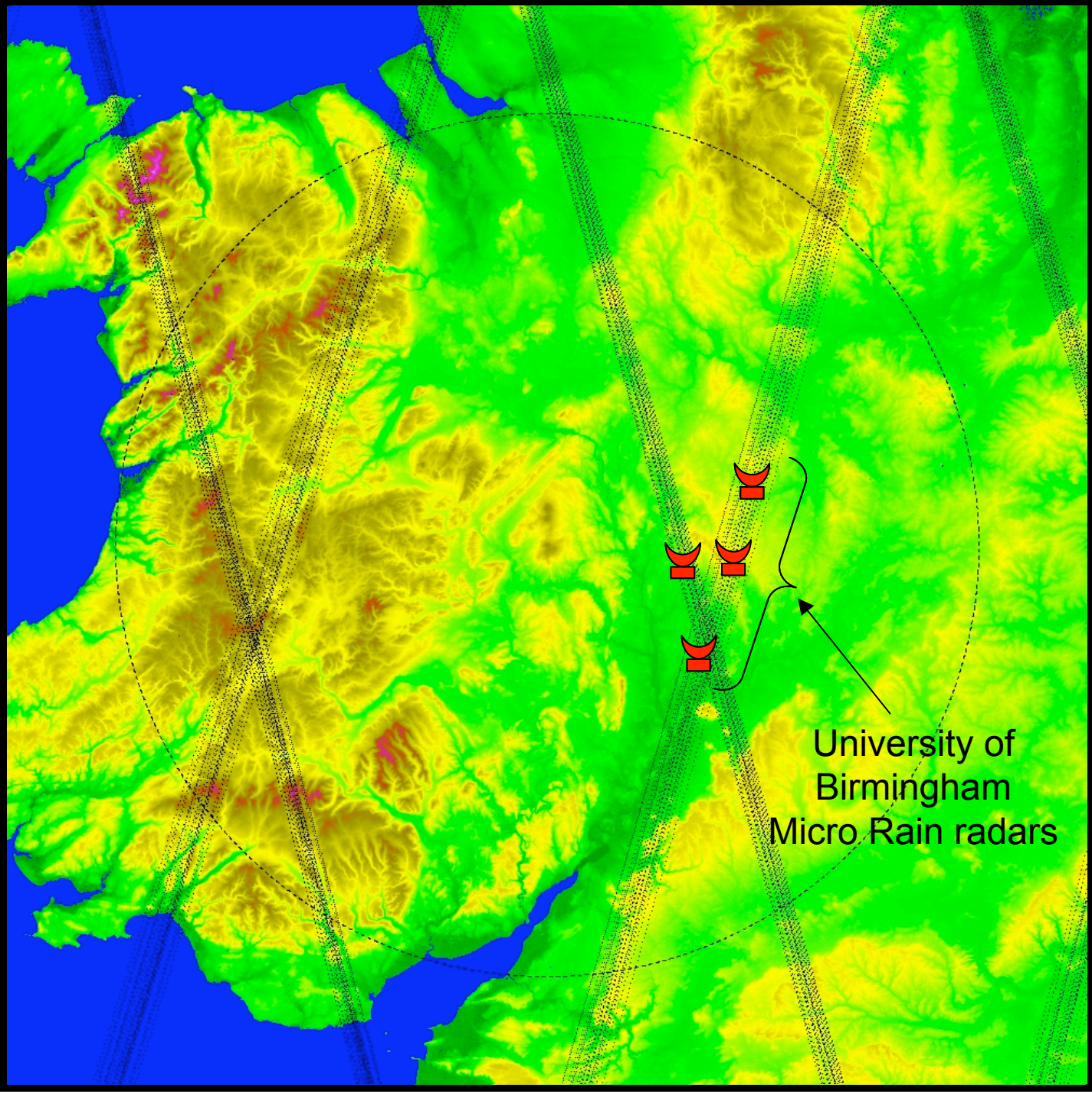
Regional Validation

Clee Hill radar

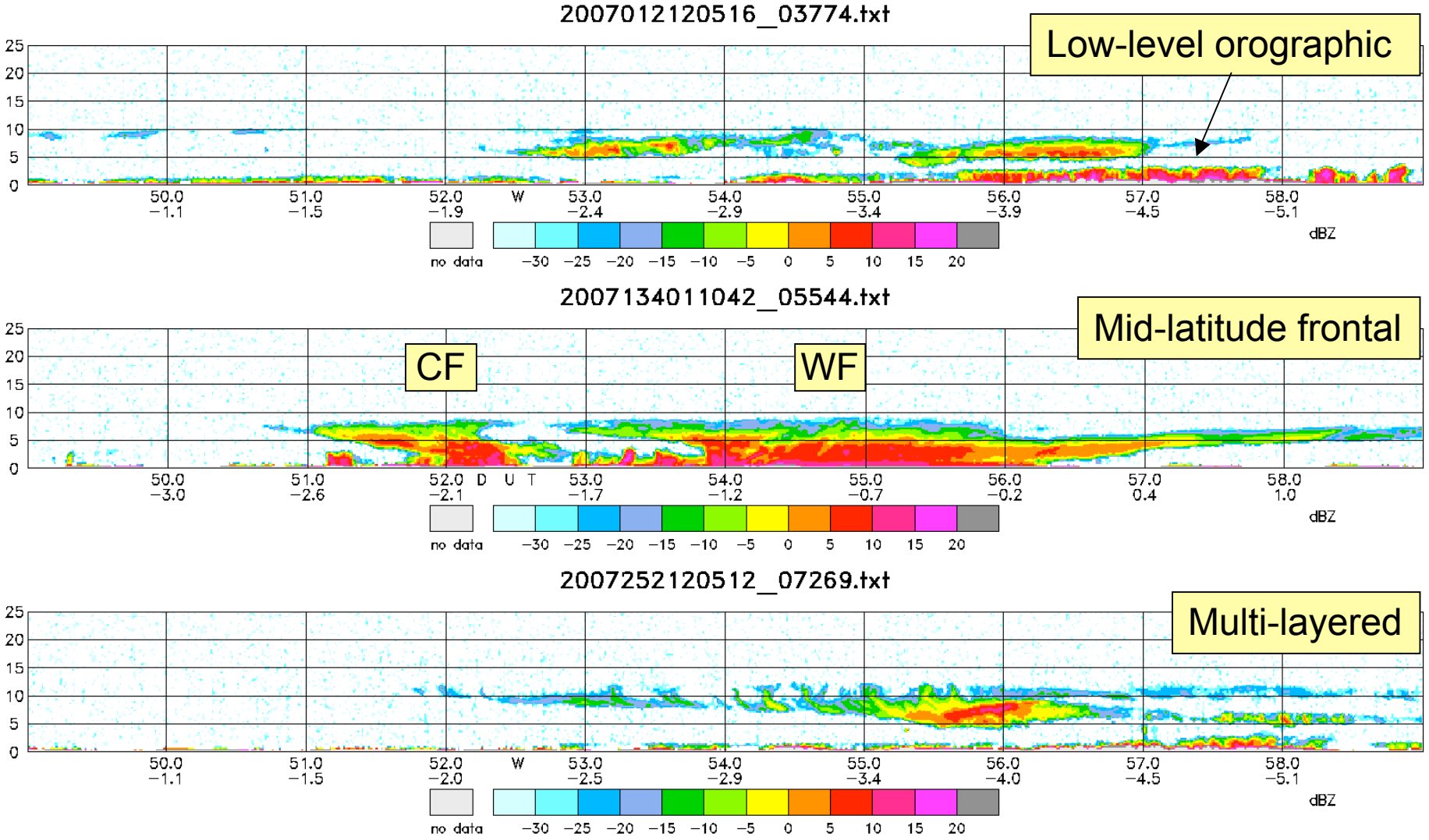
100km radius

2 km/5 min

Cloudsat tracks

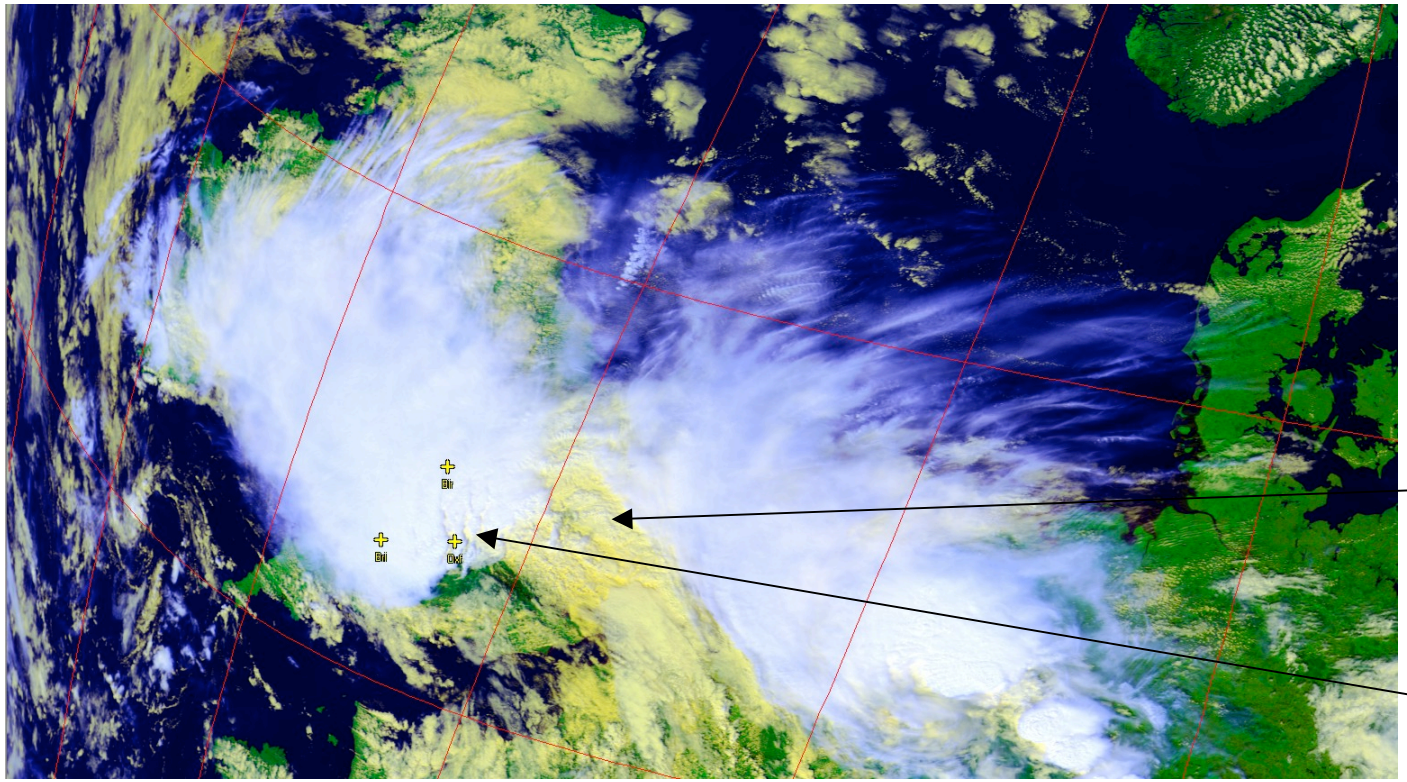


Cloudsat Profiles



20 July 2007 event

Analysis of July 2007 storms



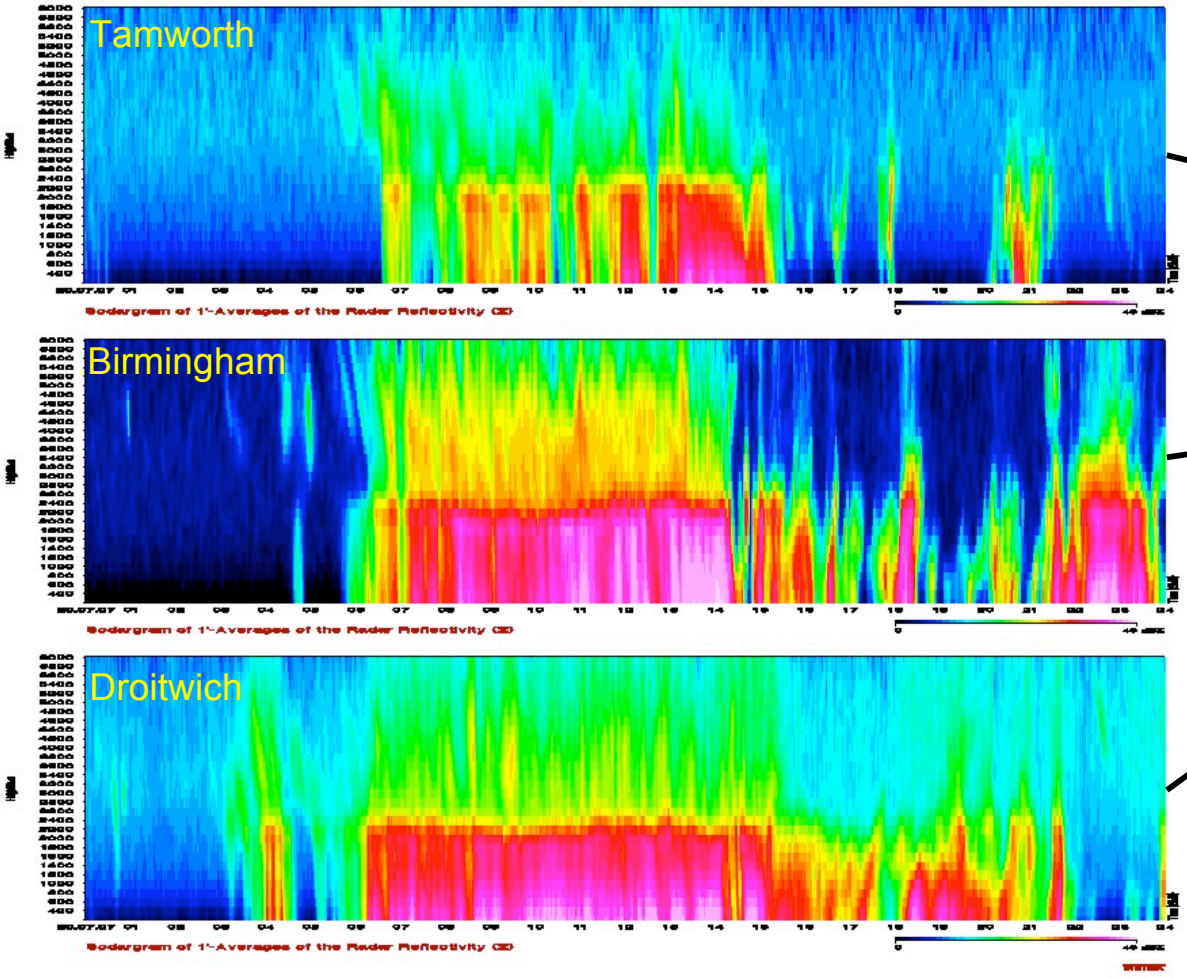
Significant rain fell over central England – up to 154mm in 12hr

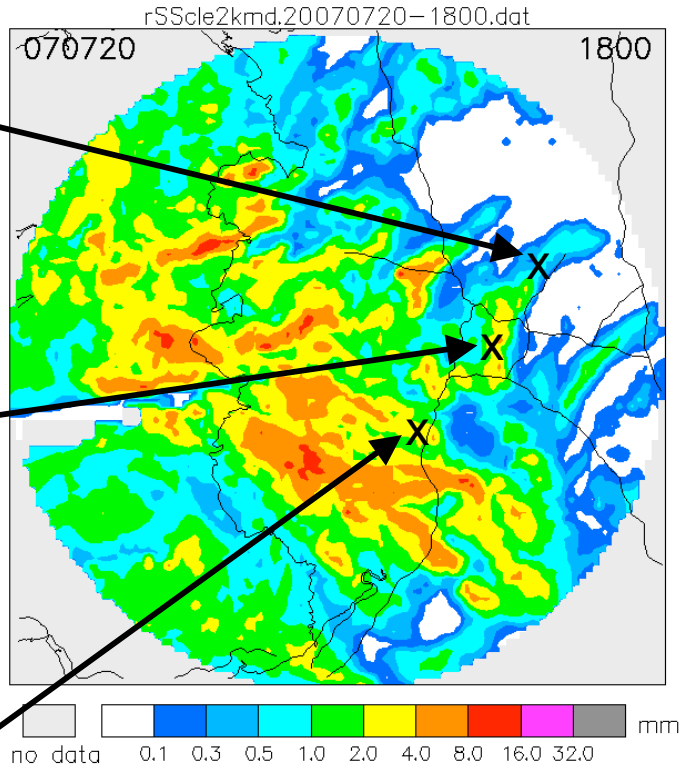
No associated lightning activity (daytime temperatures ~13°C)

Rain rates 10-20mmh^{-1} over 8 hours: over 2 billion tonnes of water

Widespread surface flooding (not fluvial)

Micro Rain Radar

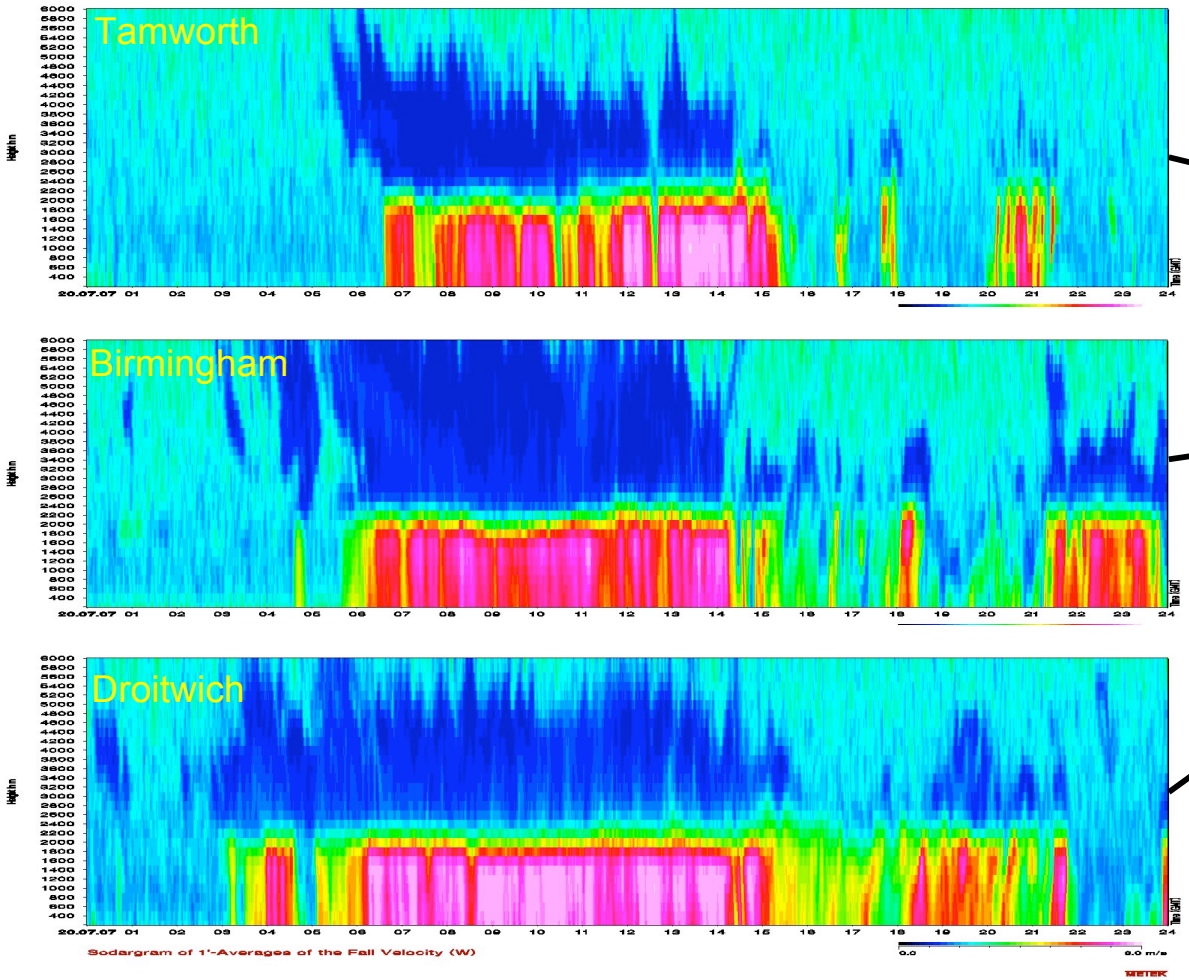


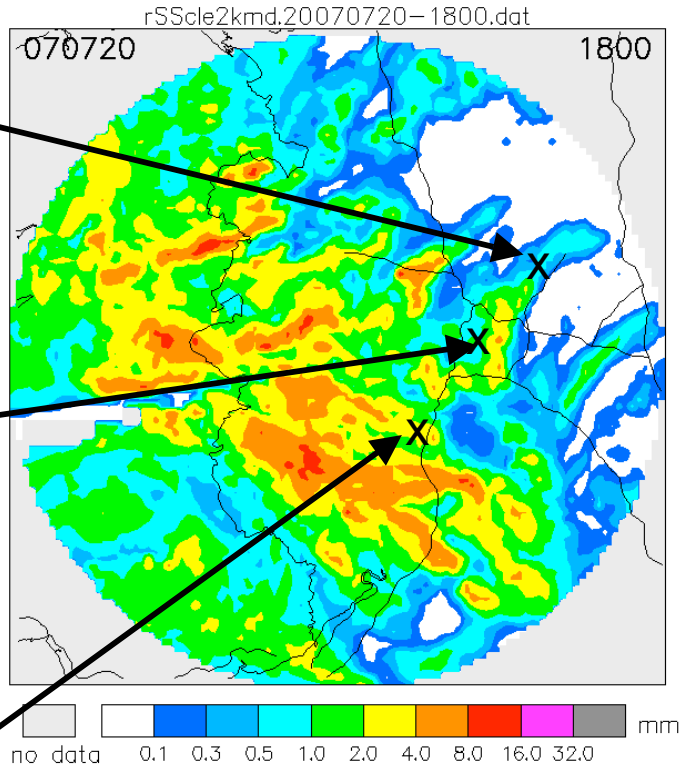


2km Clee Hill radar

Reflectivity: 20th July 2007

Micro Rain Radar



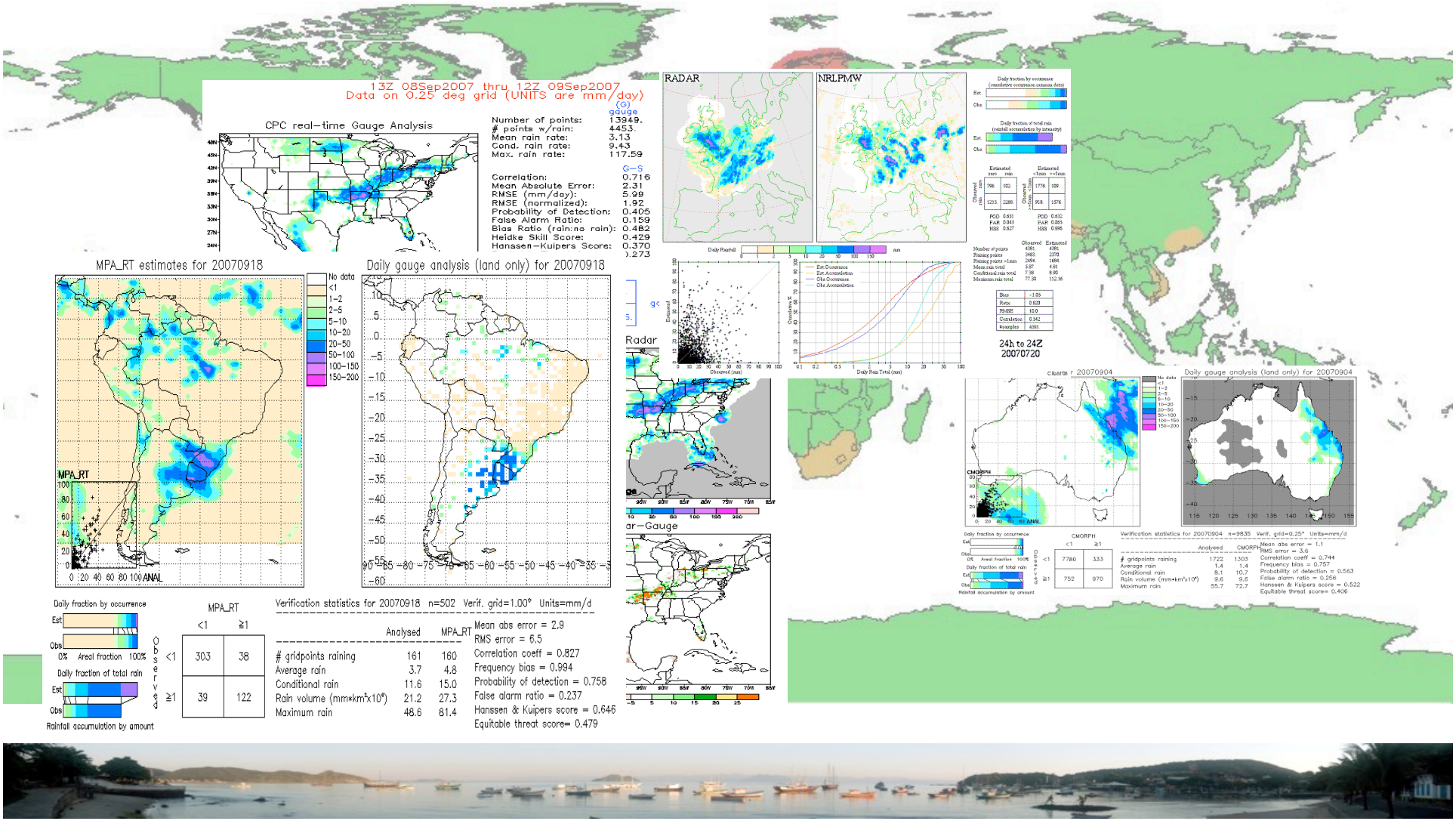


2km Clee Hill radar

Fall velocity: 20th July 2007

IPWG Inter-comparison regions

Near real-time inter-comparison of model & satellite estimates vs radar/gauge



IPWG/PEHRPP context

IPWG

- 3 'original' validation centres: Australia, Europe and the US
- South America, Japan, South Africa, Ethiopia, India, Korea … and growing
- Baseline comparisons at 0.25 degree/daily resolutions
- Validation/verification through gauge and/or radar
- Near real-time user generation of products and subsequent inter-comparisons.

PEHRPP

- As above, but 3-hourly estimates at 0.25 degree
- Primarily multi-satellite products

GPM-PEHRPP/IPWG synergies

Criteria	Satellite validation program	PEHRPP
Type of validation	Priority on physical, also statistical	Has been focused on statistical
Source of validation data	Arranged for and collected by principle investigators	Doesn't request. IPWG participants free to contribute their own
Source of observational data	Specific satellite-based products	IPWG participants provide products directly to validation groups
Types of Validation data	Gauge and/or radars, diverse in location	Conventional gauge and/or radar networks, usually part of a national network
Types of observational data	Typically single-sensor datasets, instantaneous, full-resolution	Blended satellite sensor products, time/area averaged.

Turk & Arkin, BAMS 2008

PEHRPP activities

Geneva Meeting (3-5 December 2007)

Recommendation for a HRPP inter-comparison project

Rationale:

10 years since last AIP/PIP; vast improvements, new techniques & sensors; new multi-sensor techniques (with different components)

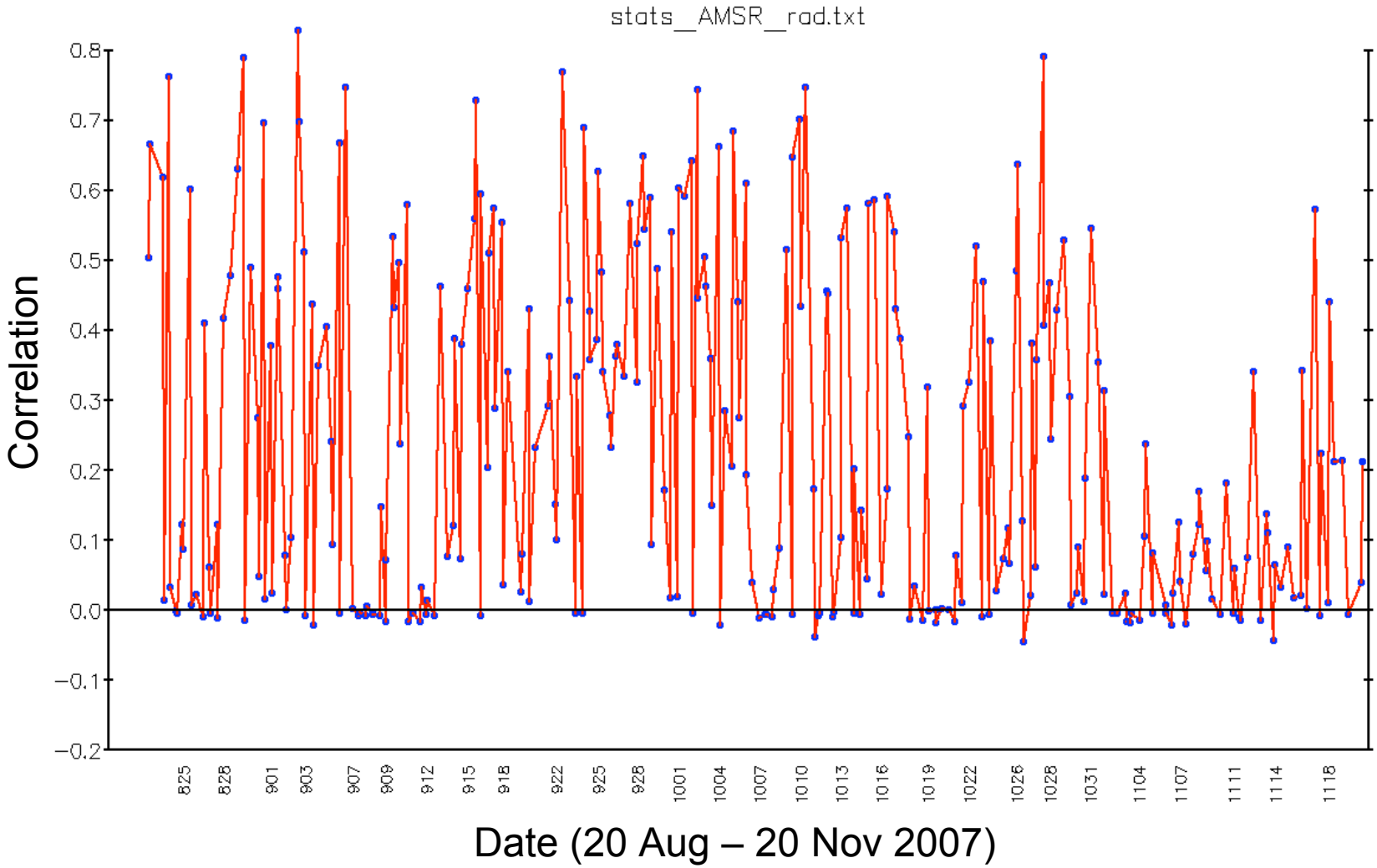
Methodology:

3 hourly, 0.25 degree estimates, 2004-2007; main validation centres, but all data available to all – encouragement of other validation regions

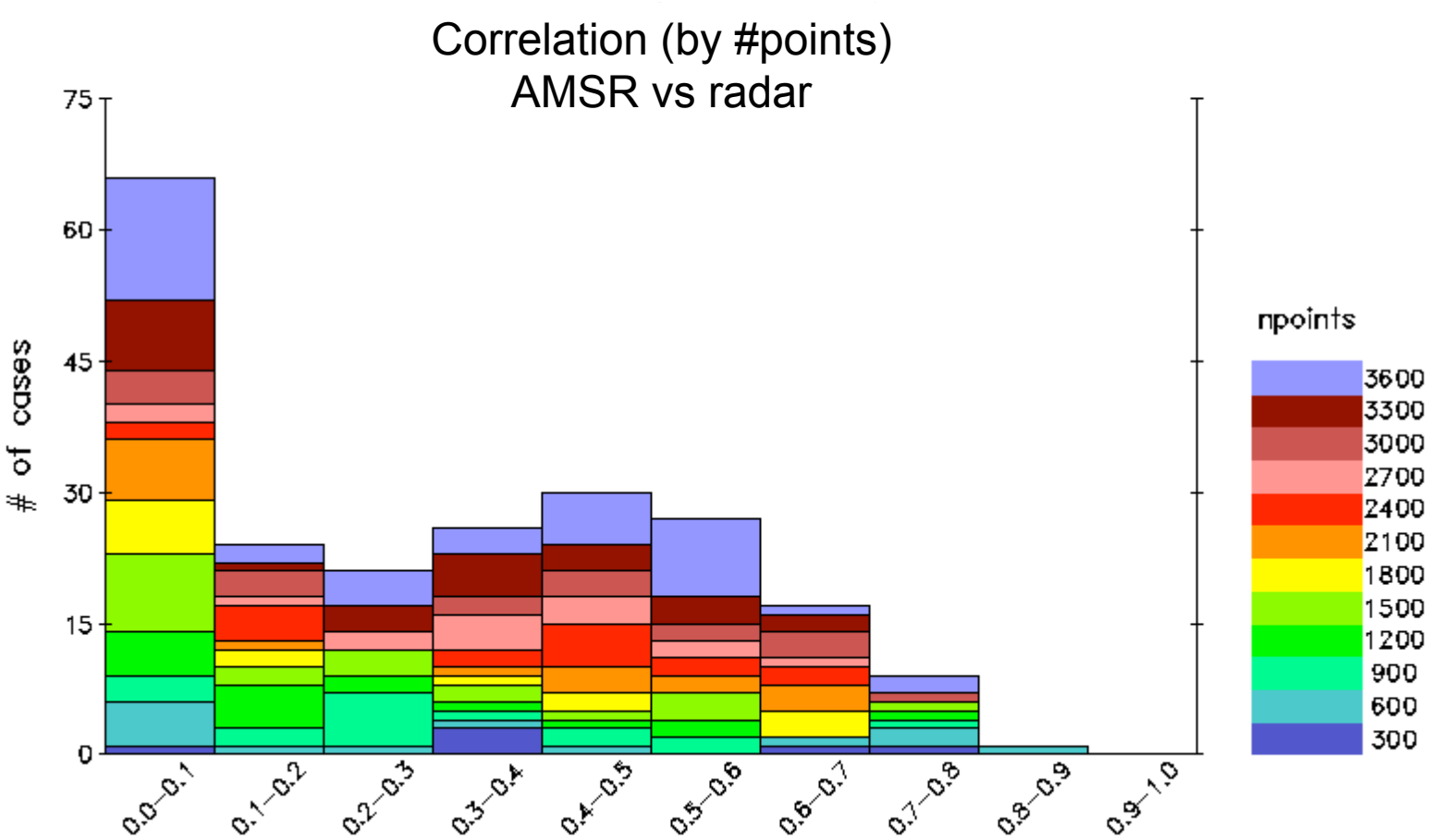
Logistics:

Completion by 2010; Funding? *Maybe instantaneous too?*

AMSR instantaneous: Europe

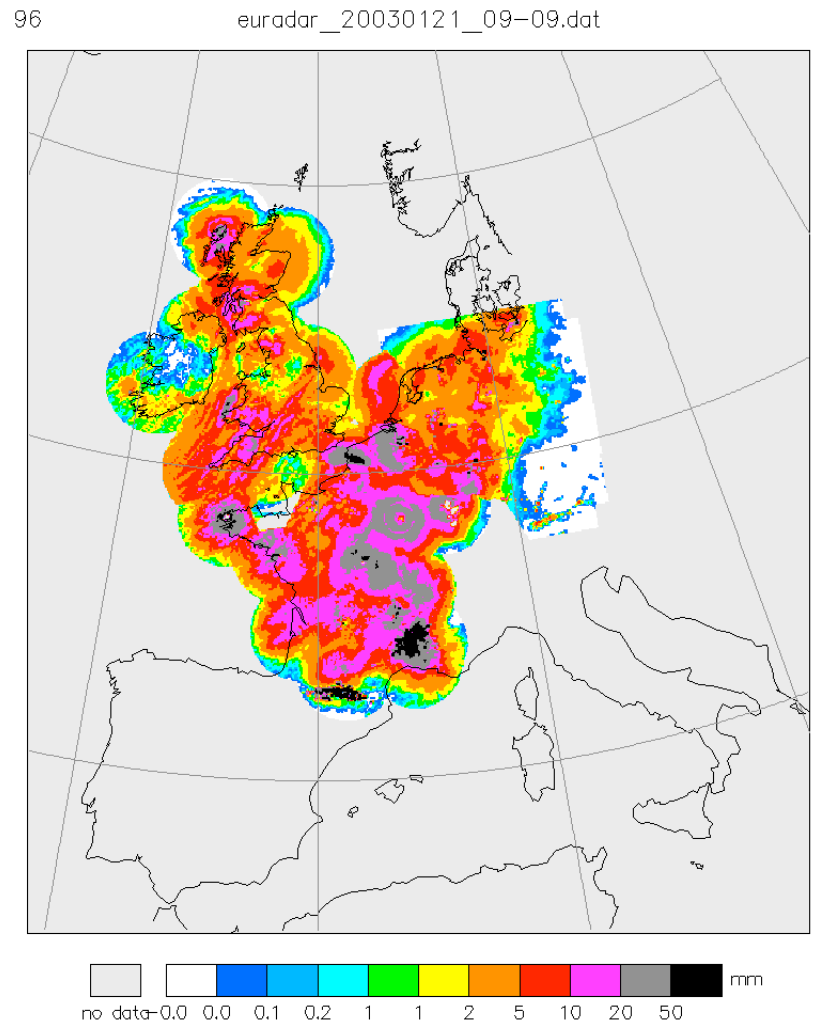


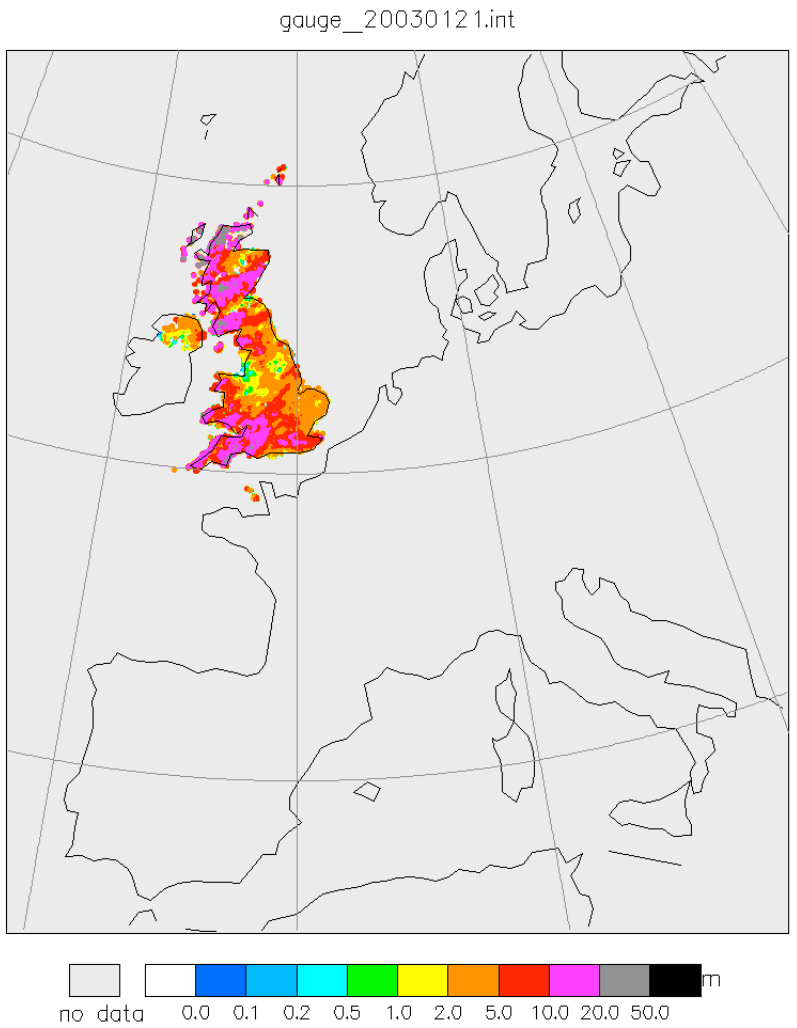
AMSR vs radar (instantaneous)



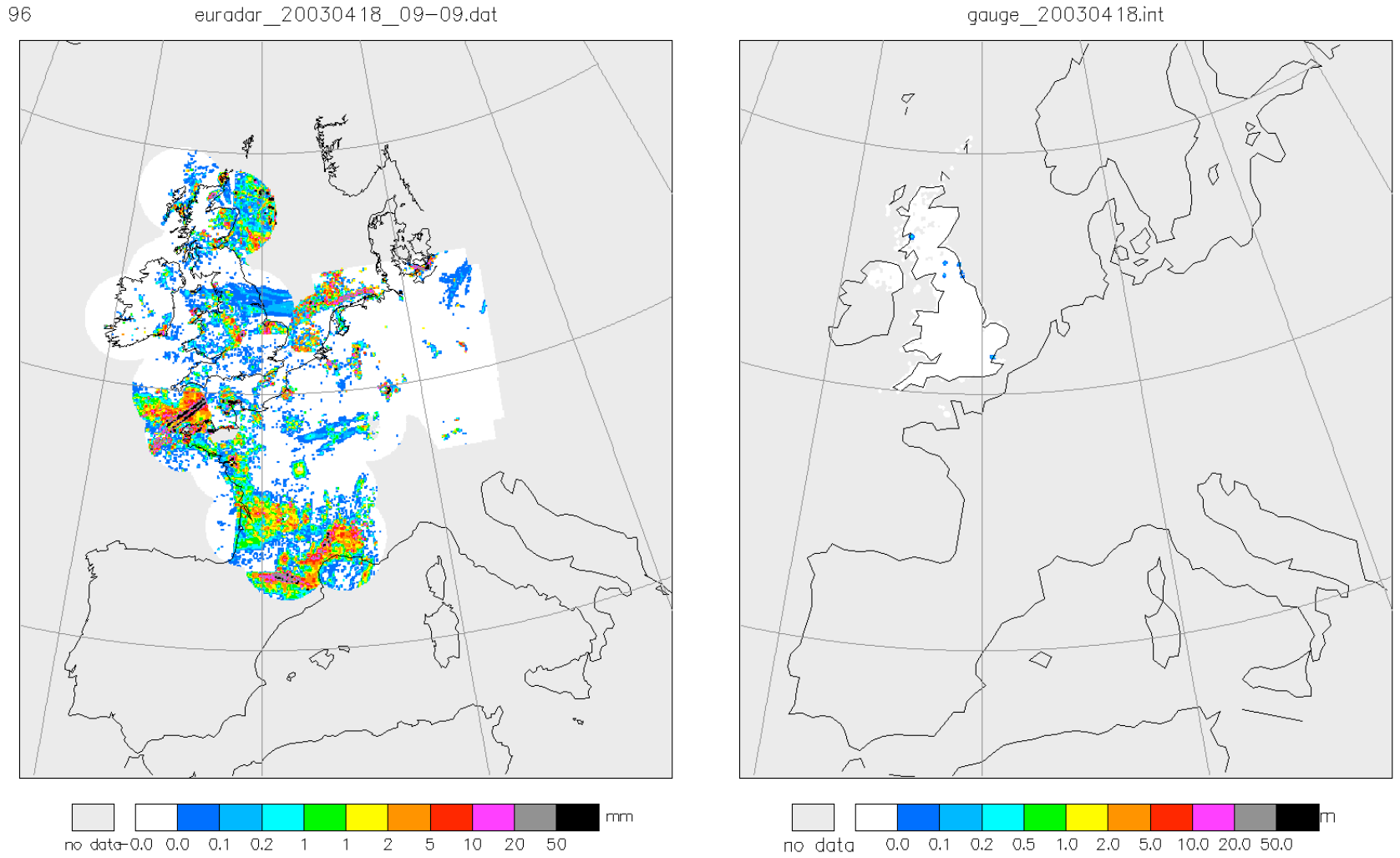
3 months of data: 20 August 2007 to 20 November 2007

Radar & gauge data

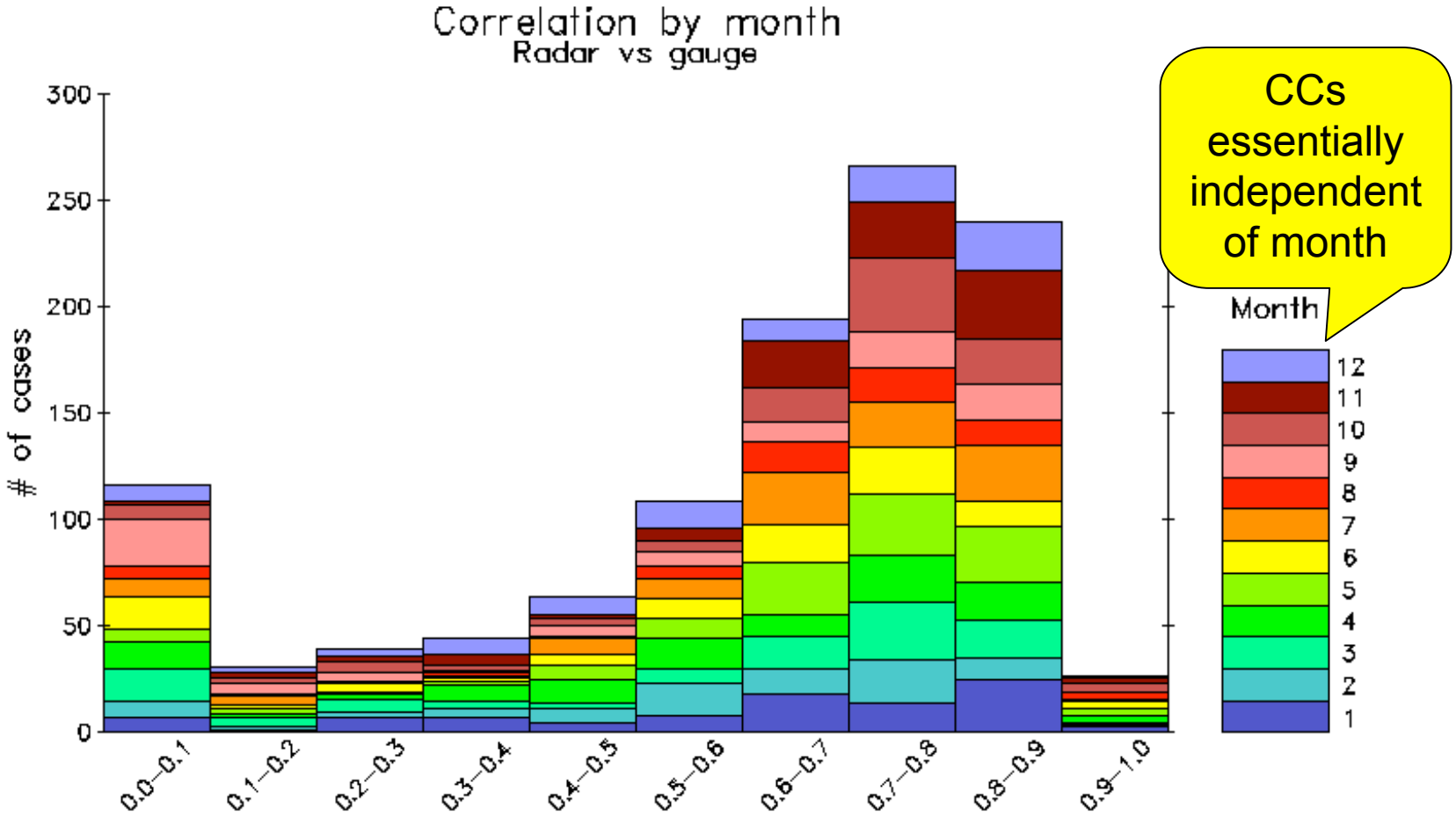




- a bad day…


96
euradar_20030418_09-09.dat
gauge_20030418.int
no data 0.0 0.0 0.1 0.2 1 1 2 5 10 20 50
mm
no data 0.0 0.1 0.2 0.5 1.0 2.0 5.0 10.0 20.0 50.0
m

Radar vs Gauge correlations



Radar is calibrated using gauge data – even so, cc's rarely exceed 0.9

Conclusions

Precipitation occurrence

- Mid-latitude precipitation is common (Petty 1996, Cloudsat, etc): a good mid/high-latitude oceanic validation site is still needed *(Shetlands?)*

IPWG

- IPWG validation regions should exploited for precipitation comparisons & adapted for instantaneous studies where possible

Multiple-truths & redundancy

- Validation requires more than a single source of 'truth', not least for consistency checks

Multi-sensor/blended algorithms

- Evaluation of current component **and** combined algorithms essential to *'see where we are*' – system, intensity, seasonal dependency…

Development/use of new statistical techniques

- Better comparative statistics that are meaningful, but also understandable

Future meetings

1-3 April 2008: Second IPWG Snowfall Workshop, Steamboat Springs, CO USA

Storm
Laborat
Second International W
Space-basec

13-17 October 2008: Fourth IPWG Workshop, Beijing, China

Web Page: http://www.isac.cnr.it/~ipwg/IPWG.html